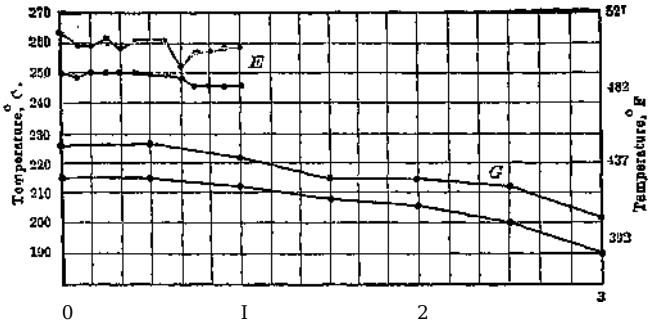

FIG. 172.

Curve showing variation in temperature at points *E* and *G* at different distances from the center line of the boiler shown in Fig. 170. Upper pair of curves shows the temperatures indicated by moving twin couple *E* 1-in steps away from center line. Lower pair of curves show indications of twin couple *G* when moved by 6-in steps away from the center.

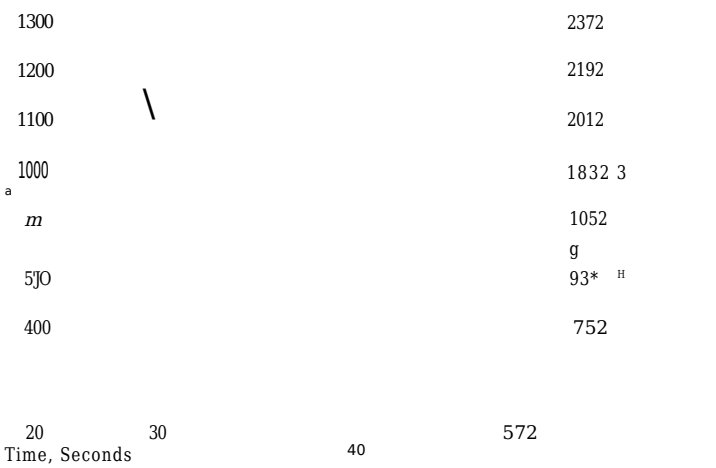

FIG. 173.—Curves Showing the Fluctuations of Temperature at Points *A* and *C* in the Boiler Shown in Fig. 170.

The fluctuations were obtained by reading the small couple at two-second intervals. These fluctuations are a beautiful illustration of the analogy between the flow of water and the flow of hot gases. Couple *C* is located near the bottom of the steam drum where it is immersed in a comparatively quiet body of gas. Couple *A* is located immediately below the tubes at a point where it would show the effects of all the surges in the stream of flowing gas. Anyone who has watched water flowing, from the top of a dam or the spout of a pump, has noticed that the flow is broken up by humerous small surges. This pyrometer shows the effect of the gas surges. Another factor contributing to these surges is the refrigerating action of the water-cooled tubes on the gases. Chilled gases will be held among the tubes in the same manner as a ball is supported by a stream of water or air, until the weight of chilled gases becomes sufficient to permit it to break its way down through the up-flowing current of hot gases. Conditions similar to this exist with all the usual forms of boiler baffling, as they are well arranged to promote this condition. One of the effects of this condition is the formation of soot and COz by the dissociation of CO instead of its combustion. Considerable heat loss results.